What is claimed is:

1. A process for removing trioxane from a use stream I of formaldehyde, trioxane and water, by

a) providing a use stream I which comprises formaldehyde as the main component and trioxane and water as the secondary components,

b) mixing the use stream I with a recycle stream VII which comprises trioxane as the main component and formaldehyde and water as the secondary components to obtain a feed stream Ia which comprises formaldehyde as the main component and trioxane and water as the secondary components,

c) distilling the use stream Ia in a first distillation stage at a pressure of from 0.1 to 2.5 bar to obtain a stream II which comprises formaldehyde as the main component and water as the secondary component, and a stream III which comprises trioxane as the main component and water and formaldehyde as the secondary components,

d) distilling the stream III, optionally after removing low boilers from the stream III in a low boiler removal stage, in a second distillation stage at a pressure of from 0.2 to 17.5 bar, the pressure in the second distillation stage being from 0.1 to 15 bar higher than the pressure in the first distillation stage, to obtain a stream IV which consists substantially of trioxane and a stream V which comprises trioxane as the main component and water and formaldehyde as the secondary components,

e) optionally mixing the stream V with a stream IX which comprises water as the main component to obtain a stream Va having a higher water content than the stream V, the stream Va comprising trioxane as the main component and water and formaldehyde as the secondary components,

f) distilling the stream V or Va in a third distillation stage at a pressure of from 1 to 10 bar to obtain a stream VI which consists substantially of water and the recycle stream VII which comprises trioxane as the main component and water and formaldehyde as the secondary components.

2. The process according to claim 1, wherein the pressure in the second distillation stage is from 1.0 to 10 bar higher than the pressure in the first distillation stage.

3. The process according to claim 1 or 2, wherein the first distillation stage is carried out at a pressure of from 0.75 to 1.25 bar.

4. The process according to any of claims 1 to 3, wherein the third distillation stage is carried out at a pressure of from 2.5 to 5 bar.

5. The process according to any of claims 1 to 4, wherein the first distillation stage is carried out in a first distillation column having at least two theoretical plates, the second distillation stage in a second distillation column having at least 2 theoretical plates and the third distillation stage in a third distillation column having at least two theoretical plates.

6. The process according to claim 5, wherein the stripping section of the first distillation column has from 60 to 90% of the number of theoretical plates of this column.

7. The process according to claim 5 or 6, wherein the stripping section of the second distillation column has from 50 to 75% of the number of theoretical plates of this column.

8. The process according to any of claims 5 to 7, wherein the stripping section of the third distillation column has from 70 to 90% of the number of theoretical plates of this column.

9. The process according to any of claims 1 to 8, wherein a low boiler removal stage is carried out between the first and the second distillation stage, in which low boilers selected from a group consisting of methyl formate, methylal, dimethoxydimethyl ether and methanol are removed from the stream III.

10. The process according to claim 9, wherein the low boiler removal is carried out at a pressure of from 0.1 to 5.0 bar in a distillation column having at least 2 theoretical plates.

11. The process according to any of claims 1 to 10, characterized by the following

composition of streams I–VII:

stream I: from 60 to 80% by weight of formaldehyde, from 15 to 35% by weight of water, from 1 to 15% by weight of trioxane;

stream Ia: from 55 to 75% by weight of formaldehyde, 15 to 35% by weight of water, 3 to 20% by weight of trioxane;

stream II: from 65 to 85% by weight of formaldehyde, 15 to 35% by weight of water, 0 to 1% by weight of trioxane;

stream III: from 3 to 20% by weight of formaldehyde, 10 to 30% by weight of water, 60 to 80% by weight of trioxane;

stream IV: from 95 to 100% by weight of trioxane, 0 to 5% by weight of water and secondary components;

stream V: from 5 to 20% by weight of formaldehyde, 15 to 35% by weight of water, 50 to 75% by weight of trioxane;

stream Va: from 5 to 20% by weight of formaldehyde, 25 to 45% by weight of water, 40 to 65% by weight of trioxane;

stream VI: from 0 to 1% by weight of formaldehyde, 99 to 100% by weight of water;

stream VII: from 5 to 30% by weight of formaldehyde, 5 to 30% by weight of water, 50 to 80% by weight of trioxane,

and the streams I, Ia, III, V, Va and VII may also contain up to 15% by weight of low boilers selected from the group consisting of methyl formate, methylal, dimethoxydimethyl ether and methanol.

12. A process for preparing trioxane from an aqueous formaldehyde solution, by feeding a stream X of an aqueous formaldehyde of a trioxane synthesis stage and converting it under acidic conditions to obtain the stream I, and removing trioxane from the stream I by the process according to any of claims 1 to 11.

13. The process according to claim 8 or 9, wherein the stream X is obtained from a stream VIII from an aqueous formaldehyde solution of low formaldehyde concentration by concentrating in an evaporator.

14. The process according to claim 13, wherein the stream IX is the formaldehyde-depleted vapor draw stream of the evaporator.

15. The use of trioxane, preparable by the process according to any of claims 12 to 14, for preparing polyoxymethylene (POM), polyoxymethylene derivatives and diaminodiphenylmethane (MDA).